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REMARKS

In the Office Action dated October 10, 2006, the Examiner rejected claims 1-3, 5-12, 14-20 and 22-24 under rejected under 35 USC 102(b) as anticipated by Sugama (US Patent Publication 2002/0118907) and claims 4, 13 and 21 were rejected as obvious over Sugama and Nakamura (US Patent 5,604,835). Claims 1-24 remain at issue.

THE ART REJECTION

The Examiner has indicated that certain claims are anticipated by Sugama. The Applicant strongly disagrees. Sugama does not anticipate the present invention as claimed.

In the Office Action, the Examiner appears to have combined several different embodiments of Sugama to reject certain claims. As explained in detail below, the different embodiments each fail to teach or suggest the present invention as claimed.

Regarding the rejection of claim 1, the Examiner relies on a waveguide system having a bottom cladding layer (22), a plurality of core channels (23) and a top cladding layer (27). Based on this description, it is assumed that the Examiner is relying on the second embodiment of Sugama, as illustrated in Figures 15 and 16A-16H, the description of Figures 15 and 16A-16H in the Brief Description of the Drawings, and paragraphs [0175] through [0185]. Since the Examiner did not positively recite a specific figure and/or paragraph number in Sugama that makes reference to these elements, the Applicant has made the response below with the assumption that the Examiner in fact was relying on the second embodiment. If this assumption is incorrect, please notify the undersigned immediately.

Figure 15 of Sugama is provided below. The figure shows a cross section of the second embodiment of the reference, which is directed to two waveguides laminated onto the top and bottom of a substrate 21. Each waveguide includes a bottom cladding layer 22, a core 23, a top cladding layer 27, and an aluminum layer 24. A groove 20 with a forty-five degree slope is formed within each waveguide. A reflective surface 25 of metal is formed on the inclined face of the groove 20.

FIG. 15

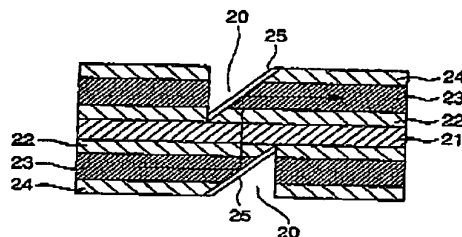


Figure 15 specifically shows the path of light transmitted through the Sugama waveguide. The arrow (no reference number is provided) clearly shows the light path as follows:

- (i) from the core 23 of the lower waveguide and reflecting upward off the mirrored surface 25 of the bottom groove 20;
- (ii) through the substrate 21; and
- (iii) off the upper reflective surface 25 and into the upper core 23 of the top waveguide.

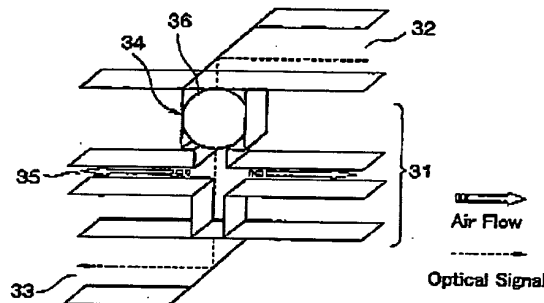
The waveguide structure of Figure 15 therefore clearly teaches that the optical vias 16 are defined by the reflective surfaces 25 of the upper and lower grooves 20.

Accordingly, in no way does Sugama teach that the cores 23 are exposed to ambient air. On the contrary, Figure 15 clearly shows that the upper and lower waveguides 23 terminate at the reflective surfaces 25. The cores 23 are not exposed to ambient air.

The Examiner also relied on the embodiment of Sugama illustrated in Figure 12. The embodiment of Figure 12 is similar in structure as the embodiment shown in Figures 9 and 10, with the exception of the lens 6. In the embodiments shown in Figures 9 and 10, a lens 6 is provided over the mirror 5 for each waveguide 3 respectively. See specifically paragraph [0160]. In contrast with the embodiment shown in Figure 12, a single lens 6 spans several mirrors 5 and waveguides 3. See the last sentence of paragraph [0168]. Therefore again, the lenses 4 illustrated in figure 12, are not exposed to ambient air. The Figures 9, 10 and 12 are provided below.

Lastly, the Examiner relied on a third embodiment as illustrated in Figure 23 of Sugama. This figure illustrates a "schematic" view of a multilayer optical wiring substrate, which includes upper and lower waveguides 32 and 33 on opposing sides of a substrate 31. See paragraph [0202]. An optical via hole 34, with a groove 35 within the substrate, is provided between the two waveguides 32 and 33 in the substrate 31. A spherical lens 36, which acts as an optical condenser, is disposed within the hole 35 above the groove 35. The purpose of the groove 35, which is filled with air or a liquid, is to relieve pressure in the optical hole 34. See paragraphs [0204] and [0214].

FIG. 23



The diagram of Figure 23 is a schematic. It is not a structural diagram. The precise structure intended by Sugama for this embodiment is therefore not specifically taught. However, based on the above-described embodiments and the schematic itself, one can reasonably conclude that the embodiment of Figure 23 in fact does not anticipate the claims of the present invention. Specifically, the core channels of waveguides 32 and 33 are not exposed to ambient air in Figure 23.

(i) as clearly evident in the figure, the lens 36 is in the optical path (as represented by the dashed line) of the core of the upper waveguide 32. The core of the upper waveguide is therefore not exposed to ambient air; and

(ii) it appears the lower waveguide 34 has a structure similar to that of the embodiment shown in Figure 15. In both the embodiments of Figures 15 and 23, the optical path is shown reflecting off a sloped reflective surface 25. Therefore, it can be rightly assumed that the core in the lower waveguide 33 of 23 Figure is just like that of Figure 15; namely the core is not exposed to ambient air.

Thus, there is absolutely nothing in Sugama with regard to Figure 23 to teach or even suggest that the cores of either the upper or lower waveguides 32 and 33 are exposed to ambient air.

The Applicant has demonstrated, beyond any reasonable doubt, that none of the embodiments relied on in the Sugama reference teach or suggest the partial exposure of the cores of a waveguide to ambient air. Sugama therefore does not anticipate the claims of the present application.

Applicant believes that all pending claims have been amended and the case is now in a condition for allowance. The Applicant respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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